

## REMARKS

Applicants thank Examiner Egan for his courteous and congenial telephone interview with Applicants' representative on September 23, 2004.

Applicants also thank Examiner Egan for withdrawing the rejection of the claims under 35 U.S.C. §103(a) over Reagan et al. ('862) in view of Sibley ('649) and Caputo et al. ('108); and the rejection of the claims under 35 U.S.C. §102(b) and §103(a) from the previous Office Action.

Applicants also thank Examiner Egan for giving proper weight in the claims to the expression "chemical vapor deposition process".

Claims 27-30 and 32-34 are pending in the present application.

Claims 27-30 and 32-34 are rejected.

Claims 27-29 and 32-34 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over U.S. 5,783,255 to Suda et al. Applicants respectfully traverse this rejection.

In the Final Rejection at paragraph 2, page 3, the U.S. Patent Office (Office) states that Suda et al. teach an example of a silicon carbide (SiC) shell with a diameter of 150 mm (18.5 inches), and that Suda et al. fail to teach that the external perimeter of the article can be increased to exceed 65 inches and that the aspect ratio can exceed 200. The Office argues that a change in size of the article of Suda et al. to meet Applicants' claimed invention would be a change in size within the level of a person of ordinary skill in the art. The Office asserts that a change in size of an article is generally regarded as such. The Office cites *In re Rose*, 105 USPQ 237 (CCPA 1955). However, the Office is in error. A mere change in size of a SiC article would not have been within the level of a person of ordinary skill in the art. The issue of size in *In re Rose* deals with lumber packages. One package was large such that it required handling by a lift truck whereas the other package could be carried by hand. The present invention is directed to a chemical vapor deposition-SiC article, which is a ceramic material. Size can be a matter of invention for ceramic materials. The holding of *In re Rose* is inapplicable to the present invention.

As pointed out in the telephone interview, changing the size of a ceramic article, such as an article of SiC as claimed in the present invention, does not involve the level of ordinary skill in the art. Changing the size of the article, i.e., making it larger, may readily lead to undesirable

cracks or defects in the article. Applicants' representative pointed this out in the telephone interview with the support the two papers submitted in response to the Office Action mailed February 17, 2004. Courtesy copies of each paper are enclosed with the Information Disclosure Statement.

The paper entitled "Applications of Chemical Vapor Deposited  $\beta$ -SiC" points out that SiC is a brittle ceramic material which is susceptible to flaw induced fracture. The strength of the article depends upon the size of the flaw in the material, which in turn depends upon the volume of the material used. Accordingly, the larger the size of the article, the higher the probability of finding a flaw of larger size. Thus, the larger the article is, the larger the flaw is expected to be, and the weaker the article. Further, the paper points out that a large article of, for example, 1 meter in diameter has a strength  $\sigma_1 = 31$  MPa, which is quite small. Such an article must be carefully handled to prevent it from damage during furnace cool-down.

The second paper entitled "ASM Handbook, volume 8, Mechanical Testing and Evaluation" points out that a ceramic having a Weibull modulus  $m$  (convenient means of reporting strength data) of  $\geq 30$  has very consistent strengths and could be practically considered to have a deterministic value of strength over a wide range of several orders of magnitude volume (see last page of paper, first column). However, as disclosed in the first paper, SiC generally has a Weibull modulus  $m = 11.45$ , which is well below 30. Accordingly, the strength of SiC is not readily determinable over several orders of magnitude of volume. Further, the second paper also points out (second column) that strength values by themselves are only half the picture. The types of defects are equally important because each flaw type has its own Weibull distribution, and because multiple flaw populations are common in ceramics. Therefore, it is essential that the defects be as clearly associated with the strength values as possible. Accordingly, size change in ceramics, such as SiC, is not generally recognized as being within the level of a person of ordinary skill in the art.

Although Suda et al. allege that their chemical vapor deposition (CVD) method enables the formation of a crack free SiC article (col. 4, lines 15-23), the articles disclosed in Suda et al. are directed to small articles with diameters such as 150mm (which corresponds to an external perimeter of about 18 inches) as admitted in the Final Rejection at paragraph 6, page 5. In contrast, the CVD-SiC articles of the presently claimed invention have an external perimeter in

excess of 50 inches and an aspect ratio of 50 or greater. Suda et al. disclose a SiC article which is much smaller than the CVD-SiC of the presently claimed invention. A person of skill in the art would not have had any reason or motivation to make the presently claimed article based on the disclosure of Suda et al. in view of the unpredictability of scaling SiC materials as discussed above.

The Office's allegation at page 6 of the Final Rejection that an aspect ratio of 200 or greater is improper is unfounded. The specification clearly provides support for this claimed range (page 14, lines 19-25). Further, it is well settled that an applicant is entitled to claims as broad as the art allows. The Office has not applied any art which would require the Applicants to narrow the scope of claim 33, nor has the Office provided any document which would show a range of greater than 200 to be untenable. The Office is obligated to provide documentary support for its arguments. In re Lee, 61 U.S.P.Q. 2d 1430.

Applicants respectfully request withdrawal of the rejection of claims 27-29 and 32-34 under 35 U.S.C. §103(a) in view of U.S. 5,783,255 to Suda et al.

Claim 30 is rejected under 35 U.S.C. 103(a) as allegedly unpatentable over U.S. 5,783,255 to Suda et al. in view of U.S. 5,776,391 to Sibley. Applicants respectfully traverse this rejection.

Claim 30 depends directly from claim 27. As discussed above, Suda et al. do not teach or suggest the subject matter of claim 27.

Sibley does not make up for the deficiencies of Suda et al. He does not teach or suggest a hollow chemical vapor deposited monolithic silicon carbide shell having an external perimeter in excess of 50 inches and an aspect ratio of 50 or greater wherein the density of said chemical vapor deposited monolithic silicon carbide is at least 3.15 grams per cubic centimeter (claims 27 and 30).

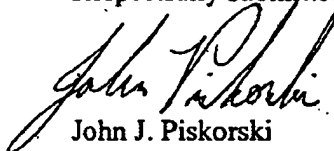
Applicants respectfully request withdrawal of the rejection of claim 30 under 35 U.S.C. §103(a) over U.S. 5,783,255 to Suda et al. in view of U.S. 5,776,391 to Sibley.

Favorable consideration and allowance of claims 27-30 and 32-34 are earnestly solicited.

If the Examiner has any questions concerning this response or the application, or if he believes the application is for any reason not yet in condition for allowance, he is respectfully

requested to telephone the undersigned at the number set forth below in order to expedite allowance of the application.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "John J. Piskorski".

John J. Piskorski

Attorney for Applicant

Registration No. 35,647

Telephone No.: (508) 229-7662

Facsimile No.: (508) 787-4730

Rohm and Haas Electronic Materials  
455 Forest Street  
Marlborough, Massachusetts 01752